

Transportation

Since the issuance of the Amended Planned Unit Development-Preliminary Master Plan approval in August 2010, the Proponent has advanced the construction of the project significantly. During this time the permitting and design of multiple individual blocks has advanced, and the comprehensive off-site traffic mitigation program was implemented in 2011. This current transportation evaluation builds upon the prior extensive analyses conducted for the *Planned Unit Development (PUD) Preliminary Master Plan, Assembly Square, Somerville, MA* which was approved by the Planning Board on December 14, 2006, and amended on August 5, 2010. The recently prepared Traffic Impact and Access Study¹ for the nearby Block 11A development also was considered as part of this current evaluation.

This section provides an evaluation of the new Block 6 development consisting of 447 residential units with 40,000 square feet of accompanying retail/ restaurant space (the “Project”). The specific potential traffic impacts associated with this current development project, as described in the following section, is also evaluated as part of this current assessment.

Proposed Block 6 Development Program

The Block 6 development will be constructed within an approximately 116,205 square foot parcel of land in the Assembly Row area of Somerville, Massachusetts (the “project area”). This parcel is bordered by Assembly Row, Canal Street, Foley Street and Great River Road. The Project involves the construction of a new approximately 417,204 square foot mixed-use building to include 447 multi-family residences and 40,000 square feet (sf) of retail/ restaurant space. The Project also includes 671 structured parking spaces within the proposed building. Of this total 447 will be allocated for the residential use with the remaining 224 spaces being available for patrons of the retail/ restaurant uses. In addition to the on-site parking supply there will be ten parallel parking spaces located along the westerly side of the parcel on Assembly Row.



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Final Level PUD Approval – Parcel 11A – Assembly Row; Somerville, Massachusetts; Vanasse Hangen Brustlin, Inc.; May 15, 2014.

The proposed development outlined above is consistent with the initial overall developments plans anticipated for Block 6 within the Assembly Square PUD. The anticipated trip generation associated with this building space is discussed in detail later in this chapter.

Vehicular Access and Circulation

Vehicular access to the 671-space parking garage within Block 6 will be provided by full-access driveways on Great River Road at the easterly end of the parcel, and on Canal Street at the northwesterly end of the building. The Great River Road driveway will be located approximately 80 feet to the north of Foley Street. The Canal Street driveway will be located at the easterly end of that roadway. The terminus of the road next to this driveway will have a one-way, counterclockwise configuration with an 18-foot wide, 75-foot long median island separating traffic flow in this area. A curb cut also will be provided on Foley Street but that will be limited to loading use only for delivery vehicles entering the building. A corresponding loading exit will be provided on Canal Street. The loading entrance driveway on Foley Street will be located approximately 110-feet to the west of Great River Road. The loading exit drive onto Canal Street will be located at the easterly end of Canal Street to the south of the parking garage driveway.

Pedestrian/Bicycle Accommodations

As part of the recently constructed roadway improvements (described later in this section) significant pedestrian accommodations are now in place near the Project site. Specifically, the newly completed Grand Union Boulevard features new 8-foot wide sidewalks along both sides of this roadway. A similar sidewalk network is also provided within the various streets making up the Assembly Row area surrounding Block 6. A 10-foot wide shared-use path extends along the easterly end of the Assembly Square District adjacent to Block 6. Crosswalks are provided on each leg of Grand Union Boulevard's intersection with Artisan Way and the Assembly Square Marketplace to the west. Further to the south, there is an existing crosswalk across the southerly side of Grand Union Boulevard's intersection with Canal Street. This location was constructed as a raised intersection to give increased prominence and awareness of pedestrian traffic in this area. Independent of the Block 6 development the proponent is currently advancing the installation of a crosswalk across the northerly end of this intersection as well. In conjunction with the new crosswalk, pedestrian curb-extensions also will be constructed at the northwesterly and southeasterly corners of this intersection. This work will involve extending these corners further into the intersection to provide a shorter pedestrian crossing across Grand Union Boulevard. These 8-foot extensions will be aligned with the adjacent on-street parallel parking so that neither the bikes lanes nor travel lanes along Grand Union Boulevard will be adversely affected by this change. This same curb-extension treatment will be implemented at the northwesterly and southeasterly corners of the

Grand Union Boulevard/ Artisan Way intersection to the north.

With the crosswalks located at the Grand Union Boulevard/ Great River Road roundabout to the north and the Grand Union Boulevard/ Foley Street intersection to the south there are ample opportunities for pedestrians to walk to and from Block 6 and the surrounding area. The clearly marked crosswalks at the major intersections within the Assembly Square mixed-use development results in a pedestrian-friendly environment which help to promote walking in this area.

The project design includes bicycle storage space within the inside of the building. The Somerville Zoning Ordinance requires 155 bicycle parking spaces. A portion of this required bicycle parking supply will be located near the retail entrances for short term use. The remaining bicycle parking will be located within the parking garage and will be easily accessible by residential tenants within Block 6 for long-term use.

Loading

Loading needs for Block 6 will be accommodated by a clearly defined loading area within the Block 6 building. As noted earlier, the loading area will have a one-way configuration with trucks entering the building from Foley Street and exiting onto Canal Street. The commercial deliveries to Block 6 are expected to occur in the same manner as other restaurant/ retail uses within the overall PUD site.

The Applicant is seeking a waiver from the loading bay requirement stated in Section 9.16. As encouraged in Section 9.16.3, the Applicant is proposing a shared loading approach for the retail and restaurant uses. By allocating less ground floor space to loading bay spaces, more ground floor area is available for uses that will further the lively pedestrian-friendly atmosphere envisioned for the district. The Project design includes three dedicated loading bay spaces located entirely within the footprint of the building, each of which complies with the minimum dimensional requirements of 12-foot wide and 30-foot long. VHB has calculated that the maximum loading need for the Block 6 building would be four loading spaces through the planned combination of retail and restaurant uses. From a functional perspective, this amount of loading spaces should not be necessary based on several factors. Individual tenant use of the loading bays by the three primary uses will be for supply deliveries and may be from smaller trucks rather than longer trailer trucks. Accordingly, some shorter-term deliveries will be able to occur with two small vans simultaneously utilizing a loading area only allocated for one larger truck per the zoning standards. Most deliveries will likely occur in the weekday morning hours. Regardless, as part of the overall site management, deliveries being made to Block 6 will be scheduled to help minimize any shared loading conflicts.

Sight Distance Evaluation

Sight distance measurements and analyses were performed in conformance with guidelines of the American Association of State Highway and Transportation Officials (AASHTO)² for the proposed Block 6 site driveway on Great River Road.

Stopping sight distance (SSD) is the distance required for a vehicle traveling along a roadway to perceive, react, and come to a complete stop before colliding with an object in the path of travel. SSD is measured along each major approach to unsignalized intersections to determine if vehicles can safely exit from a minor street or driveway approach. In this respect, SSD can be considered as the minimum visibility criterion for the safe operation of an unsignalized intersection.

Intersection sight distance (ISD) is based on the time required for perception, reaction, and completion of the desired critical exiting maneuver (a right-turn for both of the site driveways) once the driver on a minor street approach (or a driveway) decides to execute the maneuver. In this context, ISD can be considered as a desirable visibility criterion for the safe operation of an unsignalized intersection.

The required SSD and ISD for the proposed site driveways were calculated using AASHTO guidelines. Table 1 summarizes the available and required sight distances.

Table 1
Sight Distance Analysis Summary

Driveway	Stopping Sight Distance			Intersection Sight Distance		
	Traveling	Required*	Measured	Looking	Desired	Measured
Great River Road - garage driveway	Northbound	155'	400'+	Right	280'	400'
	Southbound	155'	400'+	Left	280'	400'+

* Calculated sight distance based on 25 mph design speed.

As can be seen in Table 1, the measured sight distances for the proposed Block 6 driveway exceed both the minimum SSD and desired minimum ISD requirements for the 25 mph design speed for Great River Road. While Foley Street intersects Great River Road from the west approximately 80 feet to the south of this driveway that approach is under Stop-sign control. As such, traffic turning left from Foley Street will be doing so at low speeds so that adequate sight lines still will be available. As noted earlier, there also will be a Block 6 garage driveway at the easterly end of Canal Street. With that location clear sight lines will be available looking to and from Assembly Row almost 300 feet to the west.



² A Policy on the Geometric Design of Highways and Streets; American Association of State Highway and Transportation Officials; Washington, D.C.; 2011.

Trip Generation Summary

The trip generation analysis presented during the 2010 Amended PUD approval process was a complicated exercise largely due to the timing of the new MBTA Orange Line station relative to the phased construction of the various proposed uses. However, the new MBTA station is now expected to be open as soon as late 2014 and almost all of the roadway improvements associated with the overall PUD development already have been constructed. With this mitigation now being in place the focus of this current analysis will be on evaluating the adequacy of this infrastructure to accommodate the current Block 6 proposal in addition to the surrounding development already in place. The trip generation for Block 6 was calculated using the same Institute of Transportation Engineers (ITE)³ based methodology utilized in the PUD evaluations, as well as the recent Block 11A traffic evaluation.



Block 6 Trip Generation Summary

The unadjusted trip generation estimates for the current Block 6 development proposal are summarized in Table 2 for both the proposed residential and retail/ restaurant uses.



3 Trip Generation Manual; Ninth Edition; Institute of Transportation Engineers; Washington, D.C.; 2012.

Table 2
Block 6 Trip Generation –
Total Unadjusted Trips

Time Period	Residential: 447 Units¹	Retail/Restaurant: 40,000 sf²	Total
Weekday Daily (vpd)	2,368	932	3,300
Weekday Morning Peak (vph)			
Enter	29	12	41
Exit	<u>142</u>	<u>7</u>	<u>149</u>
Total	171	19	190
Weekday Evening Peak (vph)			
Enter	137	42	179
Exit	<u>68</u>	<u>46</u>	<u>114</u>
Total	205	88	293
Saturday Daily (vpd)	2,046	1,186	3,232
Saturday Midday Peak (vph)			
Enter	93	62	155
Exit	<u>79</u>	<u>58</u>	<u>137</u>
Total	172	120	292

vpd Vehicles per day
vph Vehicles per hour

1 Source: Trip Generation Manual: Ninth Edition; Institute of Transportation Engineers; Washington, D.C.; 2012.LUC 230 (Residential Condominium/Townhouse) for 447 units.

2 Source: Trip Generation Manual: Ninth Edition; Institute of Transportation Engineers; Washington, D.C.; 2012. LUC 820 (Shopping Center) for 40,000 sf of building space.

The trip generation estimates summarized in Table 2 are the raw, unadjusted trips that could be generated by the proposed uses without any consideration for transit use, travel by bicycles and pedestrians, shared trips and other factors inherent within the mixed-use context of the surrounding area. For instance, as documented in the recent Block 11A traffic evaluation, approximately 15-percent of the overall weekday daily traffic generated by the full Assembly Square build-out would be in the form of shared trips between the various uses within the site. In this instance, those shared trips could be in the form of site residents walking to a retail shop or restaurant within Block 6 or elsewhere nearby within Assembly Square. In the absence of this mixed-use environment this would result in people already on site needing to drive-off site to visit these other uses. The exact amount of trip sharing is largely depending on the amount and type of surrounding uses, both of which will be continually changing as the overall Assembly Square site is under development. As such, varying levels of trip sharing also expect through various time of day and on weekends. Likewise, the amount of automobile traffic generated by Block 6 should be limited due to the availability of public transportation. While only five-percent of the retail customers are assumed to utilize public transportation almost half (47-

percent) of the residential trips are expected to use the nearby MBTA train or bus service.

Furthermore, retail uses typically attract a significant percentage of their customers in the form of “pass-by” trips consisting of vehicles already on the adjacent roadway that are attracted to a retail use when passing the site. The primary destination of this traffic is elsewhere and the primary trip will be resumed following a stop at the proposed development. As with previous evaluations in this area, a 25-percent pass-by rate was used to determine the pass-by trip credit for the retail trips in accordance with EEA/ EOTA guidelines.

These factors, combined with the internal trip sharing with other nearby uses, will reduce the amount of vehicle traffic associated with the new Block 6 development. Once these factors have been appropriately considered, the resulting vehicular traffic on the surrounding roadways can be estimated. Table 3 summarizes the Block 6 trip generation considering internal shared trips, mode splits and retail pass-by traffic.

Table 3
Block 6 Trip Generation –
Net New Vehicle Trips

Time Period	Total Unadjusted ¹	Shared/Transit/ Bike/Pedestrian ²	Total Net	New	Pass-By ³
Weekday Daily (vpd)	3,300	2,485	815	794	22
Weekday Morning Peak (vph)					
Enter	41	17	24	22	2
Exit	<u>149</u>	<u>75</u>	74	<u>72</u>	<u>2</u>
Total	190	92	98	94	4
Weekday Evening Peak (vph)					
Enter	179	129	50	49	1
Exit	<u>114</u>	<u>96</u>	18	<u>17</u>	<u>1</u>
Total	293	225	68	66	2
Saturday Daily (vpd)	3,232	2,182	1,050	913	138
Saturday Midday Peak (vph)					
Enter	155	96	59	50	9
Exit	<u>137</u>	<u>90</u>	47	<u>40</u>	<u>7</u>
Total	292	186	106	90	16

vpd Vehicles per day
vph Vehicles per hour

1 Source: Table 2.

2 Source: Adjustments to trip generation based on methodology outlined in *Trip Generation Manual*, Ninth Edition; Institute of Transportation Engineers; Washington, D.C.; 2012.

3 25-percent pass-by rate.

As shown in Table 3, once transit use, internal shared trips, and travel to and from the Project site by biking and walking are properly considered the resulting trip generation ranges from 66 to 90 peak hour trips. This traffic is expected to follow the same general travel patterns to and from the site as that summarized for the major site components in the Block 11A traffic evaluation. Once these trips have been distributed to the two site parking garage driveways and onto the surrounding roadway network this level of additional traffic should not have a notable impact on the operation of the surrounding roadways or intersections.

Traffic Mitigation Overview

The prior Amended PUD Transportation analysis identified several transportation-related improvements both within the Assembly Square District and in the

surrounding area. These improvements have since almost entirely been constructed. The following section summarizes these substantial roadway improvements which already have been implemented both within the Assembly Square District and on the surrounding study area roadways and intersections as part of the overall Assembly Square development to date. Recently proposed minor signal phasing and timing changes planned at the Grand Union Boulevard/ New Road/ Revolution Drive intersection as part of the nearby Block 11A development are also discussed.



Grand Union Boulevard Construction

As traffic mitigation for the planned Assembly Square Redevelopment project substantial roadway improvements were completed. Funding for these improvements (known as the Assembly Square Access Improvements “ASAI” Project) was obtained through the American Recovery and Reinvestment Act (ARRA) with construction having been completed in 2011. As part of these improvements, a new Assembly Square Drive (now named Grand Union Boulevard) was constructed from Route 28 extending south to Mystic Avenue. This new roadway now serves as the primary north-south access to the various intersecting side streets within the overall Assembly Square Mixed-Use Redevelopment. The road is a landscaped two-lane roadway (with additional turn lanes at prominent intersections and on-street parking) accommodating bicycle lanes and pedestrian sidewalks as well as vehicular traffic. Immediately to the northwest of Block 1 is a roundabout at Grand Union Boulevard’s intersection with Great River Road. This gateway location provides access to Great River Road, which serves Block 1 as well as future additional waterfront development further to the east in Block 2, while also providing an improved connection to the existing Draw 7 Park to the east of the Project site. In addition to these improvements, the following other significant off-site transportation-related enhancements have been implemented as noted below.



Assembly Square Off-Site Transportation Mitigation

In addition to the new Grand Union Boulevard, a comprehensive off-site traffic mitigation program was implemented as part of the ARRA-funded ASAI project. Specifically, the following off-site improvements previously identified during the Project’s previous local approval process have been implemented:

- **Mt. Vernon Street/Lombardi Street at Broadway/ Mystic Avenue Southbound/ Grand Union Boulevard (4 locations):** Mitigation to this interchange consisted of improvements to the existing signalized intersections of Mystic Avenue northbound/ Lombardi Street/ Grand Union Boulevard and at Broadway/ Lombardi Street/ Mount Vernon Street. The Route I-93/ Mystic Avenue southbound off-ramp intersection with Lombardi Street also was signalized along with the Mystic Avenue southbound U-turn underpass to Mystic Avenue

northbound with all of these signals constructed to operate as part of an interconnected closed-loop system.

- **Mystic Avenue Northbound at New Road:** Improvements at this location involved installing new signal equipment to return this location to its original fully-operative signalized condition.
- **Middlesex Avenue at Foley Street:** The previously inoperative traffic signal at this location was replaced with new equipment to make the intersection fully functional.
- **Route 28 at Grand Union Boulevard and Middlesex Avenue:** The former Assembly Square Drive intersection with Route 28 was reconfigured to allow exiting left turns from the newly named Grand Union Boulevard. In conjunction with this work, new signal equipment and geometric improvements also were implemented at Route 28/ Middlesex Avenue. Due to the proximity of both intersections, both locations operate under a single traffic signal controller.
- **Route 28 at Mystic Avenue Northbound Traffic Signal:** New signal equipment was installed at this location to improve the visibility of traffic on both Route 28 and Mystic Avenue at this location.
- **Kensington Avenue:** Safety and accessibility improvements were implemented at an existing pedestrian crossing connecting the northbound and southbound segments of Mystic Avenue under Route I-93.

The design of the locations listed above also featured extensive pedestrian and/ or bicycle related improvements to address existing deficiencies. Those included new signalized crosswalks, bicycle detection at traffic signals, dedicated bicycles lanes, and other measures to promote multi-modal travel within Assembly Square.



Grand Union Boulevard at New Road/Revolution Drive

With the proposed Block 11A Partners development changes are required to the signal operation at the Grand Union Boulevard/ New Road/ Revolution Drive intersection. These changes are limited to the signal operation itself and do not require any additional travel lanes, widening or other notable physical changes at this location.

Currently this intersection features a southbound “lead-phase” in which southbound left-turns run unopposed along with the adjacent Grand Union Boulevard southbound traffic. Following that phase, Grand Union Boulevard traffic runs in both directions with left-turns being allowed permissively onto either New Road or Revolution Drive. As mitigation for the Block 11A development this signal operation will be modified to provide a northbound lead-phase instead of the advance phase currently provided in the southbound direction. This will require that the green-arrow signal heads facing southbound traffic be switched to the northbound approach, and other associated changes to signal equipment also may be required.

The proposed changes to this signal operation also will result in concurrent pedestrian signal phasing instead of the current exclusive operation. This type of concurrent signal phasing is in place at multiple other comparable urban locations in the region, and also was recently implemented at Route 28's intersections with Grand Union Boulevard and Middlesex Avenue. With this revised signal phasing, pedestrians will cross New Road and Revolution Drive during the Grand Union Boulevard northbound/ southbound signal phase, and Grand Union Boulevard crossings will occur during the New Road/ Revolution Drive phase.



Grand Union Boulevard at Foley Street

Subsequent to the construction of Block 11A and the full occupancy of Blocks 1-4 and Block 6 a traffic signal will be warranted at this location. However, the required traffic signal warrants still are not satisfied to the point where signalization of this intersection is appropriate. Prior to that condition, this intersection should remain under four-way Stop control. The city recently replaced the exiting temporary stop signs with permanent Stop signs and this location, with minor additional signs accompanying this treatment planned to be installed shortly.



Route 28 at Mystic Avenue Northbound – U-turn Slot

As part of the master planning for the Assembly Square District additional measures were identified to improve egress from this area beyond the recent changes allowing exiting left turns from Assembly Square Drive onto Route 28. Specifically, during the PUD process mitigation was identified to address the anticipated increase in the exiting left-turn demand from Assembly Square onto Route 28. As currently configured, traffic exiting the Assembly Square District and wishing to return to Route I-93 southbound must exit from Middlesex Avenue onto Route 28. Even with the introduction of exiting left-turns at the Grand Union Boulevard intersection with Route 28, there is a need for another point of egress for this route. Accordingly, the following mitigation which was presented in the prior PUD approval processes still is now planned to occur concurrent with the development of Block 11A pending permit approval by MassDOT and/ or DCR.

There is space available at-grade underneath the Route I-93 overpass to provide a U-turn slot to the east of the Route 28/ Mystic Avenue intersection. This would allow for traffic traveling north on Mystic Avenue to reverse direction and access the I-93 southbound on-ramp without having to pass through the signal. The benefit to this measure is that traffic exiting the Assembly Square District wishing to return to Route I-93 would have this option as opposed to having to exit onto Route 28, travel south to the signal at Mystic Avenue, and then access the Mystic Avenue on-ramp leading to Route I-93 south. By using this route motorists will be able to bypass two

Route 28 signals, which will help alleviate traffic congestion and delays on Route 28 at two locations. From Assembly Square, this route could be accessed by exiting from either Grand Union Boulevard at Mystic Avenue/ Lombardi Street, New Road at Mystic Avenue, or by turning left from Foley Street onto Middlesex Avenue. With these multiple access options, this alternate exit route from the site has the potential for significant use. Accordingly, the following specific measures still are planned to be implemented:

- Construct the at-grade U-turn slot underneath the Route I-93 overpass to the east of the Route 28/ Mystic Avenue intersection. The entry point for this turn slot would be just east of the point where the Route I-93 off-ramp intersects with Mystic Avenue. [By locating the U-turn slot at this location potential weaving conflicts will be avoided.]
- Install a new actuated traffic signal at the point where the U-turn slot intersects the Route 28 southbound to I-93 southbound on-ramp. While it was found that there will be sufficient gaps in the opposing Route 28 southbound to I-93 southbound on-ramp traffic flow to allow for the U-turn slot to operate under a Yield condition, deficiencies in sight distances require that this location operate under signal control. The necessary signal warrants are satisfied to allow for this configuration. The signal will operate in a dependent manner to the Route 28/ Mystic Avenue northbound intersection under the same existing signal controller. This measure will result in traffic turning onto Mystic Avenue from the new U-turn slot only running during the signal phase where Route 28 southbound traffic is stopped at the Route 28/ Mystic Avenue intersection.

These plans were previously discussed at a conceptual level with both the City of Somerville and the Department of Conservation and Recreation (DCR). Independent of the current Block 6 development proposal the Proponent will be working with both parties and MassDOT to advance these plans which will be constructed by the Proponent immediately following the issuance of the required permits.

Transportation Demand Management (TDM) Plan

Transportation Demand Management (TDM) refers to measures that can be put in place to minimize or lessen the impact of vehicular traffic to an area. TDM plans are generally most effective with residential or office developments, where the same people are regularly at a given site. While orienting TDM measures toward retail traffic is more difficult, there still are opportunities for TDM success due to the mixed-use and transit-orientated nature of the overall Assembly Square site. The most important objective in implementing the TDM program is to provide appropriate alternatives to the single-occupant motor vehicle as the principal travel mode to and from the site. Most of the typically benefits associated with a TDM should already inherently be provided at Block 6 due to the mixed-use, transit-oriented environment in which the Project will be located. Several of the TDM

measures to be implemented for the entire site should also be attractive to residents at Assembly Square. Specifically, the provision of on-site bicycle parking spaces, pedestrian walkways and proximity to public transportation should also help minimize the need for vehicular travel. Combined with other planned bike accommodations within the roadways in and around Assembly Square these measures will help to promote bicycle travel to and from the site. As noted earlier, the new Block 6 retail uses should be attractive to residents or workers who wish to stay on site for their shopping, dining or entertainment needs. The proximity of Block 6 to the new MBTA Orange Line Station and existing bus routes along Grand Union Boulevard will help to promote non-vehicular travel to and from the site.

Conclusion

The proposed Block 6 development will involve the construction of 447 new residential units with approximately 40,000 square feet of accompanying retail/ restaurant space. Trip generation for this element was estimated using the same ITE-based methodology utilized for prior traffic analyses for the overall Assembly Square redevelopment. The resulting trip generation is expected to range from 66 to 90 new peak hour trips on the surrounding roadway network. Once these trips have been distributed to the two site parking garage driveways and onto the surrounding roadway network this level of additional traffic should not have a notable impact on the operation of the surrounding roadways or intersections. Accordingly, further detailed traffic analyses should be necessary for this currently proposed development. Changes to some locations along Grand Union Boulevard have recently been proposed independent of the Block 6 development. However, the Traffic Impact and Access Study for the nearby Block 11A development contained analysis of future condition with the full build-out of the Assembly Square development (including Block 6). With that analysis having been conducted it was found that the roadway infrastructure could adequately support that overall development. As the current Block 6 proposal is consistent with the assumptions used in that analysis, that finding remains unchanged with this Project.